



COMPUTER TOOLS

for Planning,
Conservation &
Environmental Protection

Article 8

In an effort to increase awareness of Internet resources available to local governments and citizen planners the Wisconsin Department of Natural Resources (DNR) has initiated a technical assistance program focused on computer tools for planning, conservation, and environmental protection. This program has been made possible by a water quality management grant awarded to the DNR by the U.S. Environmental Protection Agency (EPA).

As part of our technical assistance program we have developed this series of articles. **Each article will highlight a different tool, discuss its possible uses, and offer step-by-step tutorials.** It is our hope that the information provided here will insure that all involved in local planning processes have equal access to valuable information and analysis tools. Gaining access to these free web-based planning tools will assist communities with preliminary selection of alternative approaches to watershed and community planning. When community planners, developers, and citizens have access to similar information they are more readily able to interact and jointly discover possible solutions to land use issues.

This series of articles can be found online at <http://dnr.wi.gov/org/es/science/landuse/CompTools/local.htm>

Definition of a Tool – Predictive Modeling

To help evaluate the available tools, we have sorted them into three categories – interactive mapping, data access, and predictive modeling. This article focuses on predictive modeling tools.

Computer tools give the user the ability to evaluate alternatives and predict impacts of different land use choices. These tools perform complex analyses, but provide understandable results through user-friendly interfaces.

Land use planning and decision-making processes involve careful consideration of many complex factors, including inescapable environmental consequences. A set of computer tools can take the guesswork out of these important processes by modeling potential impacts of land use change. These tools can be used to create and manipulate different scenarios to provide a better understanding of environmental change through quantitative and visual outputs. With these tools a user can set up constraints, indicators, variables, and assumptions. By changing the values of these settings the tools can interpret a new representation of the landscape.

Land use decision-making processes can be highly contentious, fraught with uncertainties, high personal stakes, and strong emotions. These tools bring science to the process and help both the public and local governments understand the finer details and true costs of a proposed land use change. Understanding the potential consequences, both short- and long-term, can save time, money, and frustration.

Digital Watershed

Digital Watershed provides both a centralized information repository and an online computing center for watersheds in the United States. This site is based on the comprehensive database of 8-digit watersheds for the whole continent of the United States, which is included in the EPA BASINS system. The database contains all regulated facilities, river network, digital elevation models, state soil, and other data layers. Digital Watershed offers a watershed delineation tool that will prepare land use and hydrologic soil group data so you can run a selection of modeling tools.

To Use Digital Watershed

Using your Internet browser, go to www.iwr.msu.edu/dw

There are two methods of accessing your watershed.

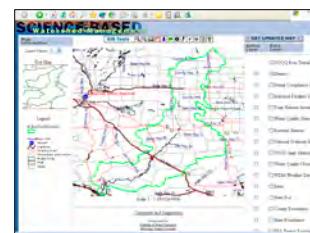
1. <Address entry> allows you to access your watershed by entering your street address, city, state, and zip.

2. To select an area using a map, click <map entry>. On the continental map of the United States, click the region where your watershed is located.

Select your watershed by clicking it on the eight-digit watershed map.

Your Watershed Management map will open in a new window. The right panel displays available data layers.

To make layers visible, check the box associated with the layer then click <Get Updated Map>.





Use <Identify> to display information about particular features on the map. Click the “Active Layer” button associated with the data layer that contains the information you want. Click <Identify> then click once on the map feature.

Visualize Topography Tool will show a 3D rendering of the watershed topography. To use this tool, click <V> once.



USPED Model Tool will provide a cell-based map showing sediment deposition based from the USPED Model. USPED (Unit Stream Power - based Erosion Deposition) is a simple model that predicts the spatial distribution of erosion and deposition rates. To use this tool, click <M> once.

Delineate Watershed Tool will prepare land use and hydrologic soil group data so you can run a selection of modeling tools. To use this tool, click the “Delineate Watershed Tool” icon in the GIS toolbar, and then click inside the watershed once. You will be redirected to the University of Purdue watershed delineation site for delineation via Dr. Choi’s tool.



The delineation process takes approximately 30 seconds. Once complete, the queried results window will be displayed. Initially you will receive an LTHIA spreadsheet screen for the entire watershed containing the BASIC-format land use acreages, broken down by four general soil association classifications (A,B,C,D).

To Run Modeling Tools from the Queried Results Window

Long-Term Hydrologic Impact Assessment (L-THIA)

L-THIA is a water quality tool that estimates changes in recharge, runoff, and nonpoint source pollution for different land use changes.

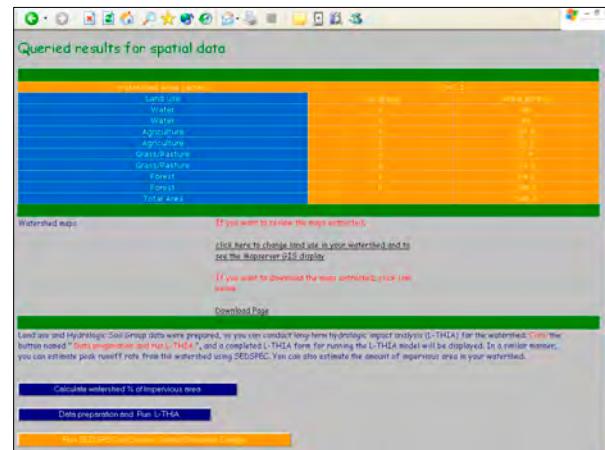
Click <Data preparation and run L-THIA>, and a completed L-THIA form for the model will be displayed. You can find information on using L-THIA at www.ecn.purdue.edu/runoff/lthianew.

SedSpec is an expert system that assists you with analyzing runoff and erosion problems on your site. The analysis will provide information about different types of runoff and erosion control structures. SedSpec will also provide customized drawings of the control structures.

Click <Run SEDSPEC for Erosion Control Structures Design> to obtain information on erosion control structures.

Click <Run Peak Runoff Estimation using SEDSPEC> to obtain peak runoff information.

You can also estimate the amount of impervious area in your watershed by clicking <Calculate watershed % of Impervious area>.



For More Information:

www.dnr.state.wi.us/org/es/science/landuse
WDNR's land use website



www.epa.gov/waterspace

Article prepared by R. Chris Welch
Bureau of Integrated Science Services
Wisconsin Department of Natural Resources



Let us know what you think of this article series. Email your thoughts to:
robert.welch@dnr.state.wi.us